

FARM FORESTRY.

By J. H. MILNE HOME, F.H.A.S., Irvine House, Canonbie.

THE title of this article will very likely be new to many readers, and they may ask what is the connection between farming and forestry. In the following pages some attempt will be made to answer this question.

Forestry or silviculture is usually looked upon as an industry which can only be properly carried on where large blocks of woodland exist, and as requiring a specialised and highly skilled class of labour. Moreover, the crops grown require, even under the most favourable circumstances, long periods of years to reach marketable size, as compared with the sowing and reaping of agricultural crops within a few months.

All this is perfectly true where forestry is practised as a considerable or principal industry in itself; but that is not the aspect of the question under immediate consideration, and it is desired to lay stress on the value and importance of the growth of timber, even on quite a small scale, as a subsidiary branch of the economy of the farm.

During the past two or three years there has been a widespread change in the ownership of land in Scotland. Occupying ownership of farms has increased to a remarkable extent, due to the breaking up of large and medium-sized estates and the purchase of farms by sitting tenants. Fortunately, owing to the recent period of prosperity enjoyed by agriculture, farmers have been better able to purchase their farms than would have been thought possible five or six years ago. They have found, however, that as occupying owners they have certain problems to face which are new, and sometimes difficult and perplexing. Life-long training and experience has taught them how best to handle land and stock so as to ensure the maximum production. The problem of dealing to the best advantage with timber and woodlands on the farm is of a different nature. So long as the farm was a part of a larger estate with a forestry staff, the woods were dealt with by the owner, and such measure of attention as the timber crops needed was provided in this way. When the timber was considered ripe for felling, it was removed by the owner and the ground replanted. The plantations upon the farm thus formed a part of a separate unit of management, and were excluded from the agricultural let.

With the sale of separate farms came the necessity of including the woodlands upon the farm, and it is in this way that "Farm Forestry" has arisen.

It is unfortunate that in too many instances the new owner has forthwith sold the whole of the timber on the farm, in order to realise some part of the purchase price, and in such instances there is not much likelihood of any replanting being done. In other cases the woodlands remain, and the new owner is anxious to make the best of them, but is in some doubt as to the system of management he should pursue.

It is desirable, in the first place, to consider from the point of view of the occupying owner the relative advantages and disadvantages of plantations in the form of strips, belts, or larger blocks, situated on agricultural land.

The advantages may be summarised as under:—

- (1) Shelter from winter storms and high winds.
- (2) Earlier growth of pasture in spring in the vicinity of woods, due to shelter.
- (3) A convenient and regular supply of fencing material, firewood, and timber in various forms for the maintenance of fences and buildings, without the necessity of purchasing the same at high prices in the open market, and the avoidance of haulage for considerable distances of a bulky article.

The disadvantages may be summarised as follows:—

- (1) On arable land the shade or shelter of trees and woodlands may retard the ripening of the corn crop, and may render the corn when cut slower to win.
- (2) The spreading of tree roots into arable land may cause trouble and delay in ploughing, and may obstruct tile or stone drains.
- (3) Plantations may harbour weeds, especially when the ground has been recently felled or newly replanted, and the weed seeds may be carried on to adjoining land under crop. The proximity of woodlands sometimes gives shelter to obnoxious flies and insects, which may be troublesome to stock. The harbouring of birds is sometimes spoken of as another disadvantage of woodlands in agriculture. While, however, some birds may be destructive through grain-eating and in other ways, many other birds living in woods are of great value to agriculture, and may be fairly considered as at least neutralising any possible harm done by other species.
- (4) The existence of plantations, especially in the form of strips or belts, usually implies the upkeep of a greater length of fencing than would otherwise be the case.

After striking a balance, however, most farmers will admit that a certain area of plantations is a useful adjunct to any

farm, more particularly on high-lying exposed situations at a long distance from rail.

A brief consideration of these advantages and disadvantages may not be out of place.

Advantages.—Shelter from winter storms and high winds. The value of shelter strips, even on farms at comparatively low elevation, is particularly evident where the land is flat and wind-swept. Even on hilly ground, however, the shelter of plantations is valuable. The months of March and April are often the most trying for stock, and in periods of cold north and east winds both sheep and cattle are generally found taking advantage of what shelter they can get under the lee of a wood. It seems probable that many of the shelter strips and belts planted a hundred years ago were specially laid out to afford the maximum of shelter. Such woods were often formed at opposite sides of a field, or in the shape of an "L" or "T" at the corner of two or more fields. The star-shaped plantation will be familiar to sheep-farmers, and although many of these plantations have now disappeared, the remains of the enclosing fences are frequently visible. The design of the star-shaped plantation was to provide shelter for sheep in a snowstorm from any quarter, and while such plantations were young or middle-aged, they no doubt fulfilled the purpose admirably. Unfortunately many such plantations when finally felled were not replaced, and hill farms are the poorer in consequence.

The earlier growth of grass in the vicinity of plantations is generally most noticeable in April and May. It is most marked, as a rule, when the shelter is on the north and east sides, and the pasture is thereby protected from the winds in that quarter, which are often prevalent in those months, and which tend so greatly to delay the much-wanted early grass. The extent of land affected varies considerably with the height of the trees and the slope of the ground, but the added greenness of the turf is often noticeable for a distance equal to four or five times the height of the trees. Where the shelter strip is of considerable length, the area affected may extend to several acres and form a fair proportion of the field.

The planting of shelter strips and belts is particularly noticeable in the counties of Berwick and Roxburgh, most of these plantations having apparently been made in the early part of the nineteenth century. The best lines to attain the object in view have evidently been studied with considerable care; and although many of these woods are now long past their prime and have become thin and bare, their usefulness still continues.

Disadvantages.—The drawbacks of arable fields surrounded by woods are well known. Not only is the ripening of the

corn crop uneven, but in wet catchy seasons much additional labour is involved in winning the corn within thirty or forty yards of the wood, especially where the trees lie to the south and obscure the sun. It is only in exceptional cases, however, that fields are entirely surrounded by woods, and such plantations have most likely not been made for the purpose of shelter for the agricultural land. Even in such extreme cases it is likely that the advantages derived from shelter while the field is in grass practically outweigh the disadvantages of the years when the field is in crop.

Tree roots extending into fields are sometimes extremely troublesome when the land has been unploughed for a considerable number of years. In land that is under regular rotation, however, roots do not cause much trouble, for the reason that they have not time to attain any great size, and are constantly being cut and broken up to the full ploughing depth. Main drains will always require attention where they pass into or near a wood. Choking from the intrusion of roots from time to time is almost unavoidable in such situations. After discharging into the plantation, the outfall should be a clear one into a ditch or open drain as soon as the fence is reached.

The growth and propagation of weeds within and upon the margin of plantations is undoubtedly prejudicial and a source of additional trouble and expense, more especially to the arable farmer. This nuisance has been particularly in evidence during the last year or two from the wholesale felling of shelter strips as well as large woods, and the subsequent growth of weeds, the seed from which is carried far and wide over adjoining fields. Unfortunately there seems little prospect of many of these areas being replanted, and in such cases the ground will remain practically waste until eventually it may grow up a mass of worthless scrub, or at best become a poor and inferior pasture. In certain cases farmers may be only too conscious of such conditions, and yet be quite unable to remedy them owing to the plantations being situated upon property belonging to another owner. Much might, however, be done by dealing carefully with the growth of such weeds in plantations which are situated on the farm. Where the ground is not yet replanted, weeds can be cut or burned before they reach the seeding stage, and in newly-planted young woods the cleaning should be similarly undertaken at the proper time, not only to prevent the weeds seeding, but for the sake of the young timber crop.

In old woods with thin canopy noxious weeds may sometimes get a footing and flourish. If the wood is not to be felled for some considerable time, such weed growth can be sometimes stopped by underplanting with beech or some other shade-bearing species. Otherwise the only remedy is to cut

the weeds before seeding. In most plantations weeds may flourish on the margins inside the fences, and in such situations they must be cut just as along the farm fences. Thistles are the most common and harmful weed spread from plantations, but many others also exist. The well-stocked wood of any age is the best protection against growth of weeds.

Farm Forestry is divisible into two parts so far as most new owners are concerned—viz., (1) the maintenance of existing woodlands; and (2) the formation of new plantations.

The Maintenance of Existing Woodlands.—It is a matter for consideration whether the whole of the existing woodlands upon a farm are worth retaining. Narrow strips or points may involve a good deal of fencing without any corresponding advantage in shelter, and such places are best excluded from the fenced woodlands as opportunity offers when fences are being repaired or renewed. As a rule, however, such plantations have been laid out for shelter or with some definite object in view, and are best retained.

The main theory of the management of large areas of forest is a continuous annual production of timber and a continuous succession of age classes—that is, in a forest of 4000 acres with a rotation of eighty years, the annual fellings should average fifty acres, and the growing crops should represent eighty graduations of age from one to eighty years. While this principle of management cannot be strictly applied to small areas of woodlands, it is nevertheless desirable to keep it steadily in view. Even in the case of quite small areas, such as ten acres of mature or nearly mature timber, the felling and replanting of one acre every two or three years will soon render the woodlands much more valuable to the farm than they would otherwise be; while the produce of the one acre felled, so far as it is unsuitable for use on the farm, can probably be sold without much difficulty, more particularly if the owner is in a position to cart the timber for the purchaser either to the railway or sawmill. Blown trees, as well as dead or dying trees, and stems broken by wind, should be removed as soon as practicable. Such timber is always useful, if only fit for firewood, and the neglect to attend to the removal of such material has been a serious blot on the forestry of this country in the past, as well as an enormous source of waste. Dead and dying coniferous trees are also the breeding-ground of several insects injurious to growing crops of timber.

The Formation of New Plantations.—On some farms there are no plantations, or such a very small acreage as to make it desirable to increase the area under wood. On rich purely arable farms it may well be the case that land is all too valuable to plant with trees, and that there are no waste corners. On most upland and hill farms, however, there must in-

evitably occur pieces of ground which are of little value for grazing or cultivation, and which in some cases it is an actual advantage to exclude stock from. Dangerous banks and scaurs, narrow steep glens, ground containing wet hollows liable to flooding and likely to produce liver-rot in sheep, occur on most farms of the type just referred to. Such ground is, as a rule, quite suitable for planting with trees, and is worth far more for that purpose than for any other. The cost of fencing at present prices must be a serious consideration; but this may easily be compensated by the greater protection of stock from accident or disease and the eventual advantage from shelter obtained.

The main principles underlying the formation, tending, and realisation of timber crops are the same for large areas of woodlands as for Farm Forestry. A few notes on these matters may be of service to those who have not hitherto had an opportunity of studying these questions.

Enclosure and Fencing.—Where woodlands already exist, the fencing has merely to be maintained or sometimes renewed. Stone dykes are one of the best types of fence for plantations, and where dykes exist they are well worth maintaining. The cost of new stone dykes is now so high that few people would care to undertake their erection unless in short lengths or for special reasons. Hedges and wire fences are both quite suitable for plantation enclosures; but hedges, unless receiving regular attention, do not often form an adequate fence, and usually require making up with wire or paling. It is sometimes difficult, even with the greatest care, to maintain a hedge in good condition on the north side of a plantation where the hedge is shaded and overhung by trees. Wood paling also makes a good fence, but is expensive, unless the timber can be sawn on the farm and thus save carting and the cost of wire. If it is necessary to use wire-netting when replanting a cleared area or in planting new ground, the cost of fencing is enormously increased. It is, perhaps, scarcely necessary to say that the rabbit is as great an enemy to forestry as it is to agriculture. Where rabbits exist in large numbers it is difficult to exclude them, even with the use of wire-netting, and economic forestry, whether on the farm or on a larger scale, becomes virtually impossible. There are instances where the use of wire-netting is inevitable, especially where plantations are situated upon or near boundaries with other properties where rabbits are not killed down. Where wire-netting is erected, it is essential to inspect it regularly in order to make sure that no holes have been made; and in snow, when drifts may have enabled rabbits to go over the wire, special vigilance is required.

Draining.—On some land draining is necessary before successful planting can be attempted; but, as a general rule,

the less draining the better, consistent with putting the ground into a suitable condition to plant. The type of drain cut is the same as the open drain made on hill ground for improving pasture for sheep or cattle. The material taken from the drains, if heaped in a ridge or in small mounds, forms useful planting ground for the young trees. Certain species of tree can stand a good deal of moisture, but few can survive or make any satisfactory growth in soil which is water-logged to the surface, and is thus in a sour condition without the possibility of air penetrating.

Species of Plants.—The species of trees most suited to Farm Forestry requires careful consideration. The problem is different in several ways from the selection of species for establishing timber crops upon a large scale. The occupying owner of a farm does not, as a rule, require much hardwood timber, nor does he need timber of specially large dimensions. Hardwoods, or broad-leaved species, may therefore be ruled out to a great extent, partly for the reason that they are slower in maturing, partly because they are more difficult to establish and to manage as a young crop, and also because the growth of heavy hardwood timber of high quality is unsuited to small areas. If it is desired to grow a few hardwoods, the most suitable species will probably be found in oak or ash, with an admixture of beech and 50 per cent of Common larch for the purpose of drawing away the hardwood leaders, the larch to be planted pure in alternate rows to the hardwoods. An exception as regards broad-leaved species may be made with regard to the Grey alder (*Alnus incana*) and certain of the poplars. These species are peculiarly suitable for planting on moist, fresh, or even on wet land such as seours, which discharge water from the ends or edges of the projecting strata, or banks where landslips have occurred. The Black Italian poplar, *Populus trichocarpa*, an American species, and some of the newer hybrids, are quite suitable for this purpose, and are very rapid in growth. There is some difference of opinion as to the best method of growing poplars; but it is probable the most satisfactory results are likely to be obtained by planting them fairly wide apart—say 15 feet or 20 feet—among other species such as spruce, letting the poplars get ahead, as they demand a large amount of light and room for the successful development of the stem. Among coniferous species there is a considerable choice for Farm Forestry. What seems likely to be required for the farm is timber of moderate dimensions, suitable for conversion into fencing material or posts and roof timbers. Quick-growing species will be preferable to trees of slower growth. Among the most rapid growing of the non-indigenous conifers of commercial value, the first place must be given to Japanese larch, Douglas fir, and Menzies or Sitka

spruce. The Common or European larch, although not a native tree, has been grown in this country for two centuries, and its characteristics and habits are quite well known. In certain districts the growth of the Common larch is about as rapid as the Japanese larch, but, as a rule, the Japanese quite outgrows the European species. The Scots pine, which is indigenous to Great Britain, produces timber of great value for constructional work, especially when of large size, but its growth is slow compared with that of the other species mentioned. The Common spruce and the Silver fir are also trees of some value, but both are comparatively slow in growth in their early stages, and for that reason are likely to be of less value in Farm Forestry than in silviculture practised on a large scale. The only other coniferous trees which may be briefly mentioned are the Corsican and Austrian pines, both of which, especially the Corsican pine, have been found to do well in certain coastal districts, where exposed to high winds and salt spray. The growth is rather quicker than with Scots pine, and the timber is somewhat coarser.

The selection of the right species of tree to plant in any given situation is of vital importance. An agricultural crop grown on unfavourable or unsuitable soil may prove a failure, but beyond the loss attending that particular season no consequent ill results need follow. A mistake made in the selection of the species of a timber crop, however, may not be immediately apparent, and it is only after some years that the error becomes obvious. Not only is the whole initial cost of the original planting and tending thrown away, but valuable time has been lost, and the whole ground may have to be replanted with another species of tree.

Generally speaking, the five species which are likely to be the most valuable in Farm Forestry are—Japanese larch, Sitka spruce, Douglas fir, Common larch, and Common spruce, in the order named.

Japanese larch is fairly accommodating, but it does not, as a rule, thrive on peaty or very dry soils, nor does it stand well exposure to high winds. The best results with Japanese larch are probably attained in districts with a rainfall of at least 35 inches, although in certain localities the growth is extremely good with an annual rainfall of no more than 26 inches. A very dry summer within a year or two of planting may cause the loss of a considerable number of plants. The species is not so frost-hardy as the European larch.

Under the most favourable circumstances of soil, situation, and climate, such as a sloping bank at moderate elevation, with a moist well-drained soil of fair loam, and a rainfall of 40 inches or more, the growth of Japanese larch is phenomenal, and may reach an average of 180 or 200 cubic feet per acre per annum over the first fifteen or twenty years.

For ordinary farm purposes, more particularly for fencing and net stakes, a good crop of Japanese larch would be of serviceable size in twelve to fifteen years, and a clear cutting might possibly be made in twenty years.

The Sitka spruce is a more accommodating tree than the Japanese larch. It withstands wind well, and is rarely broken by snow. The growth is extremely vigorous and rapid after the first two or three years, although scarcely equal to the Japanese larch or Douglas fir. The tree prefers a considerable rainfall, but also thrives well in a dry climate. Sitka spruce grows quite well on moory, rather poor soils—in fact, anywhere that the Common spruce will grow, the Sitka spruce is likely to succeed better. The plant is, however, delicate as a seedling, and very liable to injury from frost even after it is planted out. For this reason Sitka spruce should not be used in frost holes or damp hollows, and the Common spruce is more likely to succeed in such situations. The tree has not been grown in this country under forest conditions on a sufficient scale to warrant a final opinion upon its merits; but from the size and quality of the timber in the forests of British Columbia and the growth of specimen trees in Great Britain, there seems little doubt that this species, owing to its adaptability and apparent freedom from disease, is one of the most valuable introductions among foreign conifers which has yet been made. The so-called “Silver spruce,” which was greatly in demand for aeroplane-building towards the end of the war, was sawn from selected logs of Sitka spruce.

For rapidity of growth on good soil the Douglas fir is unequalled, but its use as a species for planting is limited in several ways. A good soil is essential, and while Douglas fir will stand a good deal of moisture if the soil is fresh and well aerated, it is extremely sensitive to sourness or stagnant water. Small patches in a plantation will often die off from these causes, which were not suspected at the time of planting. From ten to twenty years of age Douglas fir is liable to snow damage, and the soft, rather brittle growth of the leaders and branches may be seriously damaged by a fall of wet snow. Douglas fir does not stand exposure to wind well, and requires a sheltered situation for the best results. It is also somewhat frost-tender owing to the habit of making a second growth in the autumn. For these reasons Douglas fir should only be planted where there is a reasonable prospect of its success. It is quite unsuited to poor moory soils with considerable exposure. Where the tree can be successfully grown it is equal to, if it does not exceed the Japanese larch in the rapid production of timber.

The value of the timber of the Common larch is well known, and the lasting properties, as compared with the spruce or

even Scots pine, are frequently demonstrated by the examination of the material in an old post-and-wire fence. Larch grows well in both wet and dry climates ; it is not exacting as regards soil, and will stand more exposure than the Japanese variety. Unfortunately, however, the larch disease—a fungus parasite on the stem and branches—is now so widespread and fatal as to render it useless in certain places to plant any larch at all.

The Scots pine, Common spruce, and Silver fir are all useful species, and as their value has been proved by generations of experience, they are not to be lightly discarded. At the same time, it must be recognised that the much more rapid growth of the species already described make them more desirable for use in Farm Forestry than the slower-growing older species.

Any one in doubt as to the best species to plant is recommended to apply for advice either to a local forester of standing, or to the Divisional Advisory Officer of the Forestry Commission.

Plants and Planting.—The size of plants for putting out into plantations is a matter of some importance. Frequently the plants used are too large, under the mistaken impression that they will soon make a crop. Within limits, however, it may be said that the smaller the plants used the quicker and the more satisfactory the results.

The usual rule is to employ what are known as two-year two-year plants for planting out—that is, trees which are four years old from seed, and have been two years in the seed-beds and two years in the nursery lines. For Japanese larch and Douglas fir, however, these plants are often too big, and better results may be got with three-year-old plants. Where the growth of herbage or bracken is not very rank and coarse, moderate-sized plants can be safely used. It is not suggested that in Farm Forestry operations any attempt should be made to grow the plants required from seed. Some owners may prefer to purchase two-year seedlings from the nurserymen, and line them out in a corner of the garden for either one or two years. Good well-rooted plants may be secured in this way, and the only labour involved after lining out is to keep the soil stirred and absolutely free from weeds between the lines. In the great majority of cases, however, the plants will be obtained from nurserymen who specialise in this trade. Forest transplants have for the past two years been extremely scarce and high in price ; but with the large quantities of seed sown in 1919 and 1920, it is anticipated that plants will by another season be fairly plentiful and obtainable at much more moderate prices. It is unlikely that the pre-war prices of 20s. to 30s. per 1000 for transplants can return ; but there seems no reason why a rate

of 40s. per 1000 should not be reached, and still leave a reasonable profit to the grower.

The best distance for planting is a matter which has recently excited a good deal of discussion, the high cost of labour and plants making economy in the number of plants used the more imperative. While there is some danger of going to extremes in wide planting, there is a fair consensus of opinion among foresters that for the newer coniferous species—Japanese larch, Douglas fir, and Sitka spruce—5 feet 6 inches to 6 feet apart is not too wide, provided that every vacancy is filled until the young crop is established. For Common spruce and Scots pine a rather less distance is necessary—4 feet 6 inches to 5 feet. The saving in cost by planting at 6 feet instead of, say, 4 feet is enormous, 1210 plants per acre being required for the former, and 2700 per acre for the latter. If plants are taken as costing 50s. per 1000, and the labour of planting at 12s. per 1000, the cost for these two items will vary from £3, 15s. per acre for 6-foot planting to £8, 7s. 6d. per acre for 4-foot planting.

The method of planting usually employed for conifers is by notching, or the use of the circular spade. The latter method is rather more costly, but its use is spreading. Notching, if carefully done, is, however, quite effective. Pitting is very costly, and is rarely resorted to unless in the case of hardwoods.

The care of the young plantation for the first few years is almost as important as the planting. It is essential to cut all rough weeds, grass, and bracken before these attain such a size as to smother the young plants. Where brackens are strong, two cuttings in one season are often necessary. Brambles, wild raspberry, whin, broom, and birch are often troublesome weeds, and may entirely suppress a crop of young trees if not kept in check. All dead trees should be replaced each season until the crop is fully established without any gaps.

The cost per acre of establishing a young crop is so variable that it is difficult to give even average figures. Assuming the planting distance to be 6 feet, and allowing 25s. per acre for cleaning and beating up blanks, the cost per acre would amount to £5, but to this falls to be added the outlay upon drainage if required and the cost of fencing. The latter item may be nominal if the plantation is already fenced, or may at current rates of 2s. to 2s. 3d. per yard amount to far more than the cost of planting if the area enclosed is small or in the form of a narrow strip. If, in addition to the fencing, wire-netting is necessary, a further very large outlay may be involved.

While planting work and the cleaning of young plantations needs to be carefully done, it is quite within the competence

of a farm staff to do the work once they have been shown what is required. In this way planting work might be economically done on a farm in winter when other work was not pressing. In some cases the owner may be deterred from undertaking any forestry operations on his farm, not so much on the ground of cost, as through fear of undertaking any such scheme without skilled advice. This difficulty can, however, quite well be met by application to the District Advisory Officer already referred to, or by becoming a member of a Forestry Co-operative Society which specialises in work of this nature.

On farms situated at some distance from a sawmill, the difficulty of having timber in the log converted into fencing material or boards may be considerable, and the double cartage must in any event prove costly. Portable sawmills can be hired in some districts for a few days' sawing, but if the distance is considerable the charges must be high. Hand-sawing, except for cross-cutting, is too slow and laborious. Split fencing-stakes are sometimes used, but they are of less value than sawn stakes, and there is a good deal of waste, however carefully the splitting is done. A great many farms now have oil-engines for driving the threshing-mill, corn-bruiser, or other machinery. In other cases fairly good water-power exists for the same purpose. Where such power exists there is not much difficulty in fitting up a saw bench suited to the horse-power available, and capable of converting moderate-sized logs into fencing and construction timber. Small iron benches with a 30-inch saw can be purchased at from £20 to £25, and if it is desired to lengthen the bench for sawing rails, this can be done by a local joiner. Water-power, where available, is the most suitable for driving a saw, and is steadier than an oil-engine. Oil- or petrol-engines require to be used carefully for sawing, unless there is an ample margin of power, and the sudden application of a log to the saw may stop the engine altogether. Six horse-power is about the smallest power which can be used with advantage with an oil- or petrol-engine, although a rather less horse-power derived from water will be equally serviceable. A small saw bench of this type is also extremely useful for cutting firewood, and at the present high price of coal, the value of firewood is coming to be more appreciated than formerly.

Farm Forestry has received much attention in the United States of America for some years past, the common tenure of agricultural land being that of the occupying owner. Both the Departments of Forestry and of Agriculture have issued bulletins and leaflets on the subject, giving advice to farmers as to the management of their "woodlots," and the importance of making the most of these areas of woodlands on the farm not only in the interest of the individual, but

also in the interest of the State. In a recent number of 'American Forestry' (October 1920), a journal having a wide circulation, and devoted to the furtherance of afforestation and silviculture, the following paragraph appears :—

"Forestry increases the farm income by—

1. Making waste lands yield a profit by growing timber on poor soils, steep slopes, rocky lands, wet lands, unused corners, gullied or eroded lands.
2. Furnishing paying employment for men and teams during the winter.
3. Utilising timber better on the farm, and avoiding waste by cutting low stems and small tops, using substitute woods in construction, and treating non-lasting woods.
4. Increasing crop yields by planting forest-tree wind-breaks.
5. Growing more and better timber on the farm through protecting the woods, . . . selecting for cutting the mature, defective, over-crowded, and inferior kinds of trees, and leaving the straight, thrifty, and better kinds; planting to fill up openings in the woodlands.
6. Marketing the higher grades of wood products direct to consumers at fair prices in the form of saw-logs, poles, &c.

Make your woodlands permanently profitable."

Conditions in the United States may not be identical with those in Scotland, but there is enough similarity to make this advice well worthy of attention. The transference of the ownership of land from large estates, where the landlord and tenant system has prevailed over a long period, to the ownership of the farm by the occupier, is now an accomplished fact in many counties, and it is quite likely that the process may go further yet. This change of ownership has brought the problem of Farm Forestry prominently to the front. It is clearly in the interest of the State, as much as in the interest of the individual owner, that plantations, where such exist or might with advantage exist, as part of the farm economy, should be managed to the best possible advantage on a regular and definite system, just as with agricultural crops, so that the maximum of production may be attained.

In conclusion, reference may again be made to the danger of weed propagation from neglected woodlands. From the agricultural point of view, it is necessary to emphasise the serious loss and injury which may be occasioned from this cause, and the duty which lies upon all woodland owners, large or small, to protect both their own lands and those of their neighbours from the invasion of thistles and other noxious weeds.